

SHAUGHNESSEY NO.

REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 2/26/84 OUT APR 25 1984

FILE OR REG. NO. 4581-EUP-GO

PETITION OR EXP. PERMIT NO. _____

DATE OF SUBMISSION 12/21/83

DATE RECEIVED BY HED 2/16/84

RD REQUESTED COMPLETION DATE 5/6/84

EEB ESTIMATED COMPLETION DATE 4/29/84

RD ACTION CODE/TYPE OF REVIEW 700/EUP

TYPE PRODUCT(S): I, D, H, F, N, R, S Herbicide

DATA ACCESSION NO(S). _____

PRODUCT MANAGER NO. R. Taylor (25)

PRODUCT NAME(S) TD-1123

COMPANY NAME Pennwalt Corporation

SUBMISSION PURPOSE Proposed EUP for use on cotton

SHAUGHNESSEY NO. _____ CHEMICAL, & FORMULATION _____ % A.I. _____

100.0 Section 5 Application

TD-1123 is a potassium salt of 3,4-dichloro-5-oxythiazolecarboxylic acid is to be used to induce selective sterility in the male parts (non-dehiscent anthers) of cotton flowers. This will serve as a practical method for developing true hybrids varieties of cotton.

100.1 Application Rate/Method/Directions

Refer to attached directions.

100.2 Target Organism

Selective sterilization of cotton flowers.

100.3 Precautionary Labeling

This product is toxic to fish and wildlife. Do not contaminate water by cleaning of equipment or disposal of waste.

100.4 Objectives

There is evidence that different varieties of cotton may exhibit varying susceptibilities to applications of TD-1123 by inducing male sterility, undersired female sterility and plant injury. Because of these unknown factors, it is necessary to test the compound on a wide range of varieties across the U.S. cotton belt, in a number of different geographic and environmental zones. Pennwalt is therefore, requesting permission to distribute 160 lbs of TD-1123 acid equivalent for use on a total of 80 acres in seven states (<20 acres per state).

100.5 Directions/Date/Amount/Shipped

A. Proposed period of shipment is June 1984 to June 1986.

B. Permission is requested for 160 lb ai.

100.5.1 Geographical Distribution

Seven states in the southern cotton belt.

101.0 Chemical and Physical Properties

101.1 Chemical Name

Salt of 3,4-dichloro-5-oxythiazolecarboxylic acid

101.2 Common Name

Pennwalt TD-1123

103.0 Behavior in the Environment

No data

103.0 Toxicological Properties

103.2.1 Avian Acute Oral LD₅₀

<u>Organism</u>	<u>Test Result</u>	<u>Test Material</u>	<u>Category</u>
Bobwhite Quail	LD ₅₀ = 3000 mg/kg	29.2% ai	Supplemental

103.2.3 Fish Acute LC₅₀

<u>Organism</u>	<u>Test Results</u>	<u>Test Material</u>	<u>Category</u>
Rainbow Trout	LC ₅₀ > 4000 ppm	29.2% ai	Supplemental
Bluegill	LC ₅₀ > 8000 ppm	29.2% ai	Supplemental

104.0 Hazard Assessment

104.1 Discussion

TD-1123 is the potassium salt of 3,4-dichloro-5-oxythiazolecarboxylic acid and is used to induce selective sterility in the male parts of cotton flowers.

104.2 Likelihood of Adverse Effects to Non-Target Organisms

The EEB can not assess the possibility for adverse effects of TD-1123 on fish and wildlife, at this time. Data pertaining to TD-1123's behavior in the environment and toxicological properties has not been submitted to EPA. The accompanying acute studies (Bobwhite quail LD₅₀; Rainbow trout and Bluegill LC₅₀) were conducting on a 29.2% formulation of TD-1123, suggesting that the herbicide is practically non-toxic to birds and freshwater fish. However, this information can not support registration requirements because the technical compound was not tested.

104.2.1 Endangered Species

EEB can not assess the possibility of hazard until the appropriate environmental and toxicological data is submitted.

104.3 Additional Data Requirements

Prior to consideration of registration for the proposed use, additional studies on the technical are required:

1. Acute dietary LC₅₀ testing performed on two avian species one species of wild waterfowl (mallard) and one species of upland game bird (bobwhite quail or ring-necked pheasant). 163.71-2.
2. Single-dose oral LD₅₀ test performed on one avian species (mallard or bobwhite quail). 163.71-1
3. Static acute LC₅₀ test performed on one coldwater fish (rainbow trout) and one warm-water species (bluegill). 163.72-1

4. Static acute LC₅₀ test performed on immature aquatic invertebrates (Daphnia). 163.72-2

104.6 Conclusions

The EEB does not object to this proposed EUP. However, the registrant should be informed that the six basic toxicity studies listed in section 104.3 must be submitted prior to registration.

Michael Rexrode 4/25/84

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EEB/HED

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Norman Plank for CB 4-25-84

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1. Chemical: Pennwalt TD-1123
2. Citation: Roberts, S. 1977. Acute oral toxicity of Pennwalt TD-1123 29.2% Active in Bobwhite quail, prepared by Cannon Lab., Reading, Pa. for Pennwalt Corp, King of Prussia, Pa.
3. Reviewed by: Miachel Rexrode
Fishery Biologist
EEB/HED
4. Date Reviewed: 4/11/84
5. Test Type: Avian Acute Oral
6. Test Species: Bobwhite quail
7. Test Material: Pennwalt TD-1123 29.2% ai
8. Reported Results: The acute oral LD₅₀ was calculated at 3000 mg/kg (2100-4600 mg/kg)
9. Reviewers Evaluation: This study appears to be scientifically sound, but can not support registration. Testing was conducted on the formulation (29.2% ai) and not the technical. However, with an LD₅₀ = 2600 mg/kg, the formulation, TD-1123, appears to be practically non-toxic to birds.

Methods/Materials

Bobwhite quail not less than 16 weeks old were obtained from Morris Quail Farm, Miami, Florida. Acclimation was conducted for 7 days prior to bioassay and birds were fed standard laboratory diet (Anthony's Game Chow) ad libitum. Birds were randomly assigned to test groups of 10 birds and were housed in wire screened pens (70 cm x 90 cm x 24 cm). Birds were fasted for about 15 hour prior to dosing. Test material was administered by gavage so that each bird received the desired dosage at one time. Dosage levels were as follows (gm/kg BW) 1.0; 3.0; 6.0; 9.0; 12.0. Controls were conducted using sterile water. birds were under observation for 14 days. Body weights were taken at 0, 7, and 14 days. Food consumption was measured at 7 and 14 days. Dose mortality data is listed in table 1.

Table 1. Dose-Mortality For the Acute Oral LD₅₀ of TD-1123 29.2% ai in Bobwhite Quail

<u>Dose (mg/kg)</u>	<u>Total mortality</u>	<u>Percent mortality</u>
1000	0	0
3000	6	60
6000	9	90
9000	10	100
12000	10	100
control	0	0

Gross necropsy was not conducted, birds were described as either "normal" or "dead".

Reviewer's Conclusion

Testing procedures appear to be acceptable as described in this report. However, temperature and humidity values were not listed, and gross necropsies were not conducted. The toxicity was verified by EEB as an LD₅₀ = 2600 mg/kg (1900-3900 mg/kg) which concurs with the reported result of 3100 mg/kg (2100-4600 mg/kg).

This test appears to be scientifically sound, but, will not support registraton. Testing was conducted on the formulation (29.2% ai) instead of the technical. However, with an LD₅₀ = 2600 mg/kg, the formulation, TD-1123, appears to be practically non-toxic to birds.

Category: Supplemental

Rationale: Formulaton used instead of technical.

TD-1123 ACUTE ORAL AVIAN g/kg

CONC.	NUMBER EXPOSED	NUMBER DEAD	PERCENT DEAD	BINOMIAL PROB. (PERCENT)
12	10	10	100	.0976563
9	10	10	100	.0976563
6	10	9	90	1.07422
3	10	6	60	37.6953
1	10	0	0	.0976563

THE BINOMIAL TEST SHOWS THAT 1 AND 6 CAN BE
USED AS STATISTICALLY SOUND CONSERVATIVE 95 PERCENT
CONFIDENCE LIMITS, BECAUSE THE ACUTAL CONFIDENCE LEVEL
ASSOCIATED WITH THESE LIMITS IS GREATER THAN 95 PERCENT.

AN APPROXIMATE LC_{50} FOR THIS SET OF DATA IS 2.60988

RESULTS CALCULATED USING THE MOVING AVERAGE METHOD

SPAN	G	LC_{50}	95 PERCENT CONFIDENCE LIMITS	
2	.167754	2.75373	1.94976	3.91392

RESULTS CALCULATED USING THE PROBIT METHOD

ITERATION	G	H	GOODNESS OF FIT PROBABILITY
5	.294258	1	.874096

SLOPE = 4.91858
95 PERCENT CONFIDENCE LIMITS = 2.25047 AND 7.58669

LC_{50} = 2.86793
95 PERCENT CONFIDENCE LIMITS = 1.82 AND 3.83318

LC_{50} = 1.58257
95 PERCENT CONFIDENCE LIMITS = .566391 AND 2.28449

1. Chemical: Pennwalt TD-1123
2. Citation: Roberts, S. 1977, "Static 96-hr Toxicity Study of TD-1123 in Bluegill Sunfish and Rainbow Trout," prepared by Cannon Lab., Reading, Pa., for Pennwalt Corp, King of Prussia, Pa.
3. Reviewed by: Miachel Rexrode
Fishery Biologist
EEB/HED
4. Date Reviewed: 4/12/84
5. Test Type: Static Acute 96-hour Fish Toxicity
6. Test Material: Pennwalt TD-1123 (29.2% ai)
7. Reported Results: The LC₅₀ values for Rainbow Trout and Bluegill Sunfish were calculated at greater than 4000 and 8000 ppm, respectively.
8. Reviewer's Evaluation: This test is scientifically sound but can not support registration. Formulated product was used instead of the technical. However, with an LC₅₀ > 4000 ppm, TD-1123 appears to be practically non-toxic to fish.

Materials/Methods

The size of all test specimens (bluegill and rainbow trout) were about 35-75 mm in length and 0.5-3.0 grams in weight. Bluegill were obtained from Kurtz's Fish Hatchery, Elverrson, Pa. and the trout were obtained from Greenwalk Trout Hatchery, Bangor, Pa.

After a 10 day acclimation period and range finding, fish were housed in 37-liter all glass aquaria with 30 liters well-water (water quality is expressed in Table 1). Controls (negative) were established for both fish species and showed no mortalities during the 96-hr test. Twenty bluegill were subjected to one concentration level, 8000 ppm, with only one mortality (5%). Rainbow trout were tested at three concentration levels, 2000, 3000, and 4000 ppm. Mortality for these fish amounted to 9 (45% at the 4000 ppm level. Although, mortality levels appeared to be insignificant for both species, behavioral observations noted that rainbow trout displayed abnormal respiration after 24-hours at all test levels. This behavior was noted for bluegill after 48-hours at the 8000 ppm level (only level tested).

Reviewer's Conclusion

This test appears to be scientifically sound, but since testing was conducted on a formulation, the requirements for registration have not been met. However, at > 4000 ppm, TD-1123 appears to be practically non-toxic to fish.

Table 1. Water Quality Parameters for Acute Toxicity Testing of TD-1123 on Bluegill and Rainbow Trout

Turbidity	0.	NTU	pH	7.5	
Color	0.		Conductivity (mmhos/cm)	520.	
Odor	None		Est Tds by conductivity	320	PPM
Total Hardness	14.7	GPG	Chemical Oxygen Demand		PPM
Iron (Fe)	0.7	PPM	Compensated Hardness	16.	PPM
Manganese (Mn)	0.0	PPM	Nitrate (N)	1.7	PPM
			Silica	7.0	PPM
- Cations -			- Anions -		
Calcium	8.7	GPG	Chloride	0.6	GPG
Magnesium	6.0	GPG	Sulfate	2.8	GPG
Sodium	0.5	GPG	Nitrate	0.4	GPG
Potassium	0.1	GPG	Hydroxide Alk.		GPG
			Carbonate Alk.		GPG
			Bicarbonate Alk.	11.5	GPG
Total Cations	15.3	GPG	Total Anions	15.3	GPG